

quick start guide



hp surestore fc  
1Gb/2Gb switch 16B

[www.hp.com](http://www.hp.com)

---

## Notice

© Hewlett-Packard Company, 2001. All rights reserved.

Part number: A7340-96002

Edition: E1201

Hewlett-Packard Company makes no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Hewlett-Packard shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

This document contains proprietary information, which is protected by copyright. No part of this document may be photocopied, reproduced, or translated into another language without the prior written consent of Hewlett-Packard. The information contained in this document is subject to change without notice.

Use, duplication, or disclosure by government is subject to restrictions as set forth in subdivision (c) (1) (ii) of the Rights in Technical Data and Computer Software Clause at DFARS 252.227.7013.

---

## Warranty

If you have any questions about the warranty for this product, contact your dealer or local Hewlett-Packard sales representative.

---

## Trademarks

BROCADE, the Brocade B weave logo, Brocade: the Intelligent Platform for Networking Storage, SilkWorm, and SilkWorm Express, are trademarks or registered trademarks of Brocade Communications Systems, Inc. or its subsidiaries in the United States and/or in other countries.

All other brands, product or service names are or may be trademarks or service marks of, and are used to identify products of services of their respective owners.

---

## Safety notices

Any servicing, adjustment, maintenance, or repair must be performed only by authorized service-trained personnel.

---

## Format conventions

<i>variable</i>	Indicates that you must supply a value.
output	Denotes text displayed on the screen.
[ ]	Indicates that the enclosed element is optional and may be left out.
{ }	Indicates that you must specify one of the listed options.
	Separates alternatives.
...	Indicates a repetition of the preceding parameter.

**Tip** Denotes ideas for enhanced product usage.

---

**Note** Denotes significant concepts or operating instructions.

---

---

**CAUTION** Denotes a hazard that can cause hardware or software damage.

---



---

**WARNING** Denotes a hazard that can cause personal injury or death.

---

---

# CONTENTS

Revision History .....	v
Updates .....	v
Related Publications .....	v
<b>1 Installing the Switch .....</b>	<b>1</b>
Product Description .....	1
Safety Guidelines .....	1
Package Contents .....	2
Installing the Switch as a Stand-Alone Unit .....	3
Installing the Switch in a Rack .....	4
<b>2 Setup .....</b>	<b>13</b>
System Components .....	13
SFP Media Side .....	14
Power Supply Side .....	15
Power Supply .....	15
Fabric Operating System .....	16
SFPs .....	16
Fibre Channel Cable Connections .....	16
Configuring and Connecting the Switch .....	17
Saving the System Configuration Files .....	22
Backing up the Switch Configuration Settings .....	22
Restoring the System Configuration Settings .....	23

Next Steps .....	24
Setting QuickLoop Mode on Ports .....	24
Setting Up Speed Negotiation .....	24
Configuring Supported Devices .....	25
<b>3 Diagnostics .....</b>	<b>27</b>
Switch Status Indicators .....	27
LEDs on the SFP Media Side .....	28
LEDs on the Power Supply Side .....	30
Maintenance and Diagnostic Tests .....	32
Error Messages .....	34
Getting Support .....	34
Service and Support .....	34
Additional Licenses .....	34
<b>4 Specifications .....</b>	<b>35</b>
General .....	35
Environmental .....	36
Dimensions .....	37
Power Supply .....	37
<b>Product Regulatory Information .....</b>	<b>39</b>

## Revision History

December 2001      First release.

## Updates

For the most current information about the HP Surestore FC 1Gb/2Gb Switch 16B, visit the support Web site located at <http://www.hp.com/support/fc16B>.

For information about product availability, configuration, and connectivity, consult your HP account representative.

## Related Publications

Related product information can be found in the following publications. Those publications with part numbers are provided as printed copies with your product. The HP Surestore FC 1Gb/2Gb Switch 16B Documentation CD contains all publications listed in the table below and is also provided with your product.

<b>Title</b>	<b>Part Number</b>
<i>HP Surestore FC 1Gb/2Gb Switch 16B Quick Start Guide</i>	A7340-96002
HP Surestore FC 1Gb/2Gb Switch 16B Documentation CD	A7340-11001
<i>HP Surestore FC 1Gb/2Gb Switch 16B Installation and Reference Guide</i>	Available only on CD
<i>Fabric OS Reference Manual</i> , version 3.0	Available only on CD
<i>Fabric OS Procedures Guide</i> , version 3.0	Available only on CD
<i>Fabric OS Version 3.0 Release Notes</i> , version 3.0	Available only on CD
<i>Fabric Watch User's Guide</i> , version 3.0	Available only on CD
<i>QuickLoop User's Guide</i> , version 3.0	Available only on CD
<i>Web Tools User's Guide</i> , version 3.0	Available only on CD

<b>Title</b>	<b>Part Number</b>
<i>Distributed Fabrics User's Guide</i> , version 3.0	Available only on CD
<i>Zoning User's Guide</i> , version 3.0	Available only on CD
<i>MIB Reference Manual</i> , version 3.0	Available only on CD
<i>ISL Trunking User's Guide</i> , version 3.0	Available only on CD
<i>Advanced Performance Monitoring User's Guide</i> , version 3.0	Available only on CD
<i>Merging Heterogeneous Fabrics Instructions</i>	Available only on CD

For information about Fibre Channel standards, visit the Fibre Channel Association Web site, located at <http://www.fibrechannel.com>.

---

# INSTALLING THE SWITCH

## Product Description

The HP Surestore FC 1Gb/2Gb Switch 16B is a 16-port Fibre Channel gigabit switch that supports link speeds up to 2 Gbps. Each port automatically negotiates to the highest common speed of all devices connected to the port. The ports are compatible with SFPs (small form factor pluggable media), are universal and self-configuring, and are capable of individually becoming an F\_Port (fabric enabled), FL\_Port (fabric loop enabled), or an E\_Port (expansion port).

The base product, A7340A/AZ, comes with Web Tools, QuickLoop, Zoning, and Fabric Watch. Switches purchased with the Performance Upgrade (Option 001) have four additional features: ISL Trunking, Advanced Performance Monitoring, Extended Fabrics, and Remote Switch.

## Safety Guidelines

Follow these safety guidelines to ensure successful and safe operation of the switch:

- The supply circuit, line fusing, and wire size must conform to the electrical rating on the switch nameplate.

- The ambient air temperature near the switch must not exceed 40 degrees Celsius. This is particularly important to verify if the switch is installed in a closed or multi-rack assembly.
- The volume of air flow available to the switch must be at least 300 cubic feet per minute. The air vents must not be blocked.

Follow these safety guidelines for rack-mount installation:

- The rack space must be 1U high, 19 inches wide, and 24 inches deep.
- All equipment installed in the rack should have a reliable branch circuit ground connection. Do not rely on a connection to a branch circuit, such as a power strip.
- The additional weight of the switch should not unbalance the rack or exceed the rack's weight limits.
- The rack should be mechanically secured to insure stability in the event of an earthquake.



**WARNING** For safety reasons, when installing this product in an equipment rack, you must consider rack stability against tipping. Please refer to the *Hewlett-Packard Rack System/E User's Manual* provided with the equipment rack to determine rack stability (also available in electronic format through the HP Web site at <http://www.hp.com/racksolutions/>). If the necessary stability is not achieved, through the placement of additional equipment or ballast, the equipment rack must be anchored to the building structure before operation.

---

## Package Contents

The major items contained in the FC 16B shipping carton(s) include the following items:

- One FC 16B switch, two fan trays, and one or two power supplies installed
- One 10 ft. RS-232 serial cable (convertible to an RJ-45 connector through removal of the adapter on the end of the cable)
- Two 6 ft. power cables (according to the number of power supplies included with the switch)



- Four rubber mounting feet (used only for setting up the switch as a stand-alone unit)
- Two rails and one bag of rail mounting hardware (required if the switch is to be installed in a rack):
- *hp surestore FC 1Gb/2Gb Switch 16B Quick Start Guide*
- HP Surestore FC 1Gb/2Gb Switch 16B Documentation CD-ROM

## Installing the Switch as a Stand-Alone Unit

This section provides instructions for setting up the switch as a stand-alone unit on a flat surface. The following items are required:

- FC 16B switch
- Power cables
- Rubber mounting feet

### **To set up the switch as a stand-alone unit:**

1. Check contents of the shipping carton to verify all the required parts and hardware are available.
2. Apply the rubber feet by completing the following steps:

---

**CAUTION** Installing the rubber feet on the switch is recommended to help prevent the switch from accidentally sliding off the supporting surface.

---

- a. Clean the four depressions that are at each corner of the bottom of the switch to ensure they are free of dust.
  - b. Place a rubber foot in each depression, with the adhesive side against the chassis, and press into place.
3. Place the switch on a flat, sturdy surface.
  4. Provide power to the switch by completing the following steps:
    - a. Connect the power cable to the FC 16B power supply and to a power outlet. Ensure the power cable is routed so that it is not exposed to stress.

- b. Turn on the power supply (flip the AC switch to “I”) when ready to supply power to the switch. The switch automatically runs POST (power on self-test) each time it is turned on.
- c. If the FC 16B includes a second power supply, repeat Steps 4a and 4b for the remaining power supply.

---

**Note** Do not connect the switch to the network until the IP address is correctly set. For instructions on how to set the IP address, see “Configuring and Connecting the Switch” on page 17.

---

## Installing the Switch in a Rack

This section provides instructions for installing the FC 16B in an HP or Compaq/Rittal rack.

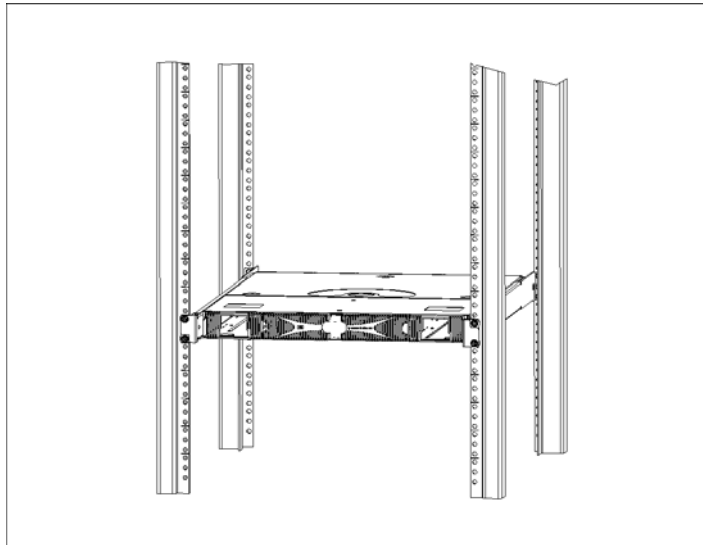


Figure 1. FC 16B Rack-Mounted Switch

The following items are required to install the switch in a rack:

- FC 16B switch
- Power cables
- #2 Phillips and T25 Torx screwdrivers
- Rails and rail mounting hardware:

(2) Rear mounting bracket



(6) #8-32 x 5/16 Phillips pan-head screw with captive star lock washer



(6) #8 Flat washer



(6) M5 Torx head screw with captive lock washer



(2) Rubber washer



(4) M5 U-type Tinnerman clip (HP rack only)



(4) #10-32 square Tinnerman nut (Compaq/Rittal rack only)



(4) #10-32 x 5/8 Phillips pan-head screw with attached lock washer (Compaq/Rittal rack only)



(6) Spacer (Compaq/Rittal rack only)



(4) M5 flat washer (Compaq/Rittal rack only)

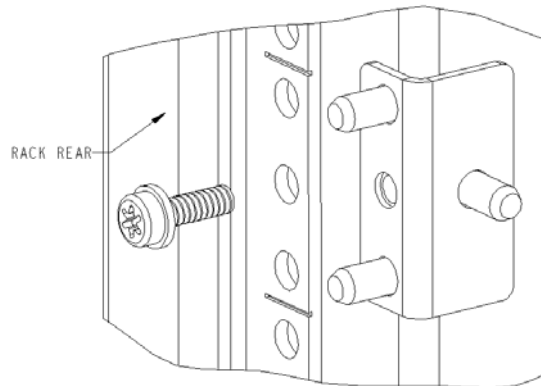
---

**CAUTION** For proper airflow, the SFP media side of the FC 16B faces the rear of the rack. This mounting allows air to enter from the front of the rack and to exhaust at the rear of the rack, similar to other rack-mounted equipment. This prevents switch overheating which may cause it to fail

---

**To install the switch in a rack:**

1. Check contents of the shipping carton to verify all the required parts and hardware are available.
2. Choose a mounting location in the rack for the switch.
3. Attach the rear rail-tray brackets to the rear rack uprights by completing one of the following steps:
  - For an HP rack, install each of the two mounting brackets with (1) M5 Torx head screw with captive lock washers as shown in [Figure 2](#).



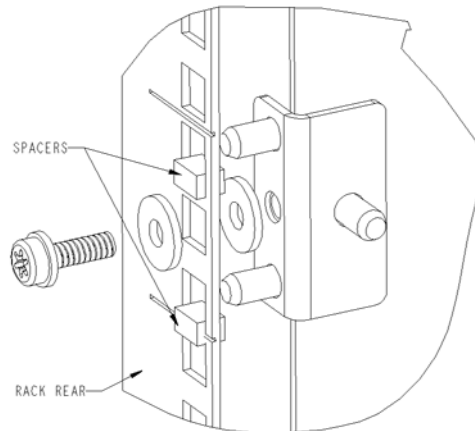
*Figure 2. Installing the Rear Rail-Tray Brackets (HP Rack-left rear upright)*

- For a Compaq/Rittal rack, assemble each of the two brackets with (2) spacers, (2) M5 flat washers, and (1) M5 Torx head screw with captive lock washers as shown in [Figure 3](#).

---

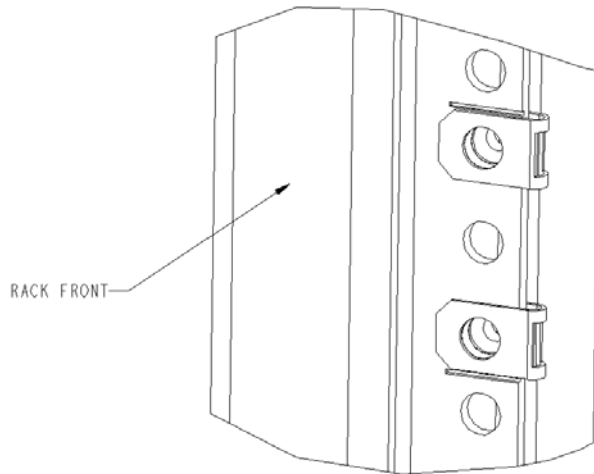
**Note** For the Compaq/Rittal rack, the alignment pins will be resting on the top surfaces of the spacers.

---



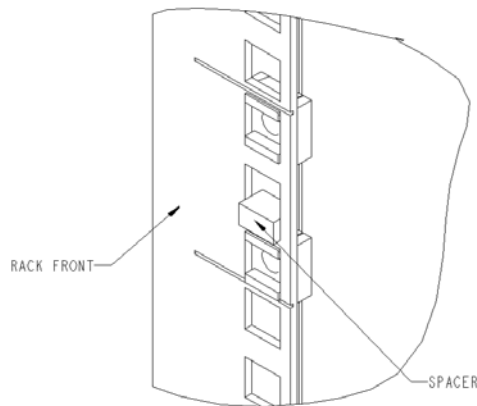
*Figure 3. Installing the Rear Rail-Tray Brackets (Compaq/Rittal Rack)*

4. Install the Tinnerman clips or nuts by completing one of the following steps:
  - For an HP rack, install (2) M5 U-type Tinnerman clips for each of the front columns of the rack in the top and bottom positions of the three-hole EIA pattern as shown in [Figure 4](#).



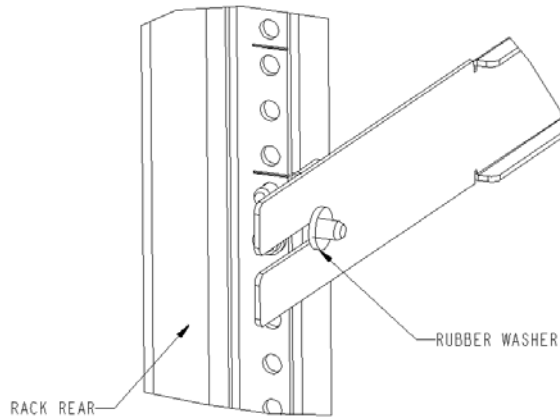
*Figure 4. Installing the Tinnerman Clips (HP Rack)*

- For a Compaq/Rittal rack, install (2) #10-32 square Tinnerman nuts for each of the front columns of the rack in the top and bottom positions of the three-hole EIA pattern. Also install (1) spacer in the center position for each column on the front of the rack. See [Figure 5](#).



*Figure 5. Installing the Tinnerman Nuts and Spacers (Compaq/Rittal Rack)*

5. Assemble the outer rails by completing the following steps:
  - a. As an aid in assembly, two rubber washers have been included to help keep the rear slotted portion of the outer rail flush against the rear rail-tray brackets. Install them as shown in [Figure 6](#).



*Figure 6. Installing the Rubber Washers*

- b. Insert the alignment pins attached to the outer rail front flange into the center opening in the rack.

---

**Note** For the Compaq/Rittal rack, the alignment pins will be resting on the top surfaces of the spacers.

---

- c. Depending on the rack you are using, complete one of the following tasks:
        - For an HP rack, install one M5 Torx screw in the upper hole location of the right rail. Then, install one M5 Torx screw in the lower location of the left rail. See [Figure 7](#).

---

**Note** Do not install the upper left and lower right screws until later.

---

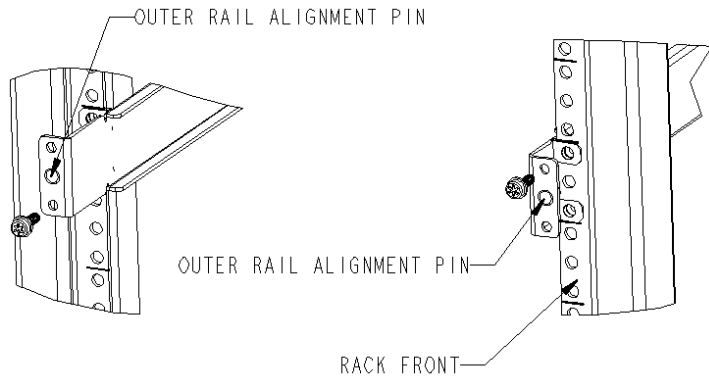


Figure 7. Assembling the Outer Rails (HP Rack)

- For a Compaq/Rittal rack, install one #10-32 x 5/8 Phillips pan-head screw in the upper hole location of the right rail. Then, install one #10-32 x 5/8 Phillips pan-head screw in the lower location of the left rail.
6. Assemble the two inner rails (one on each side) to the switch using (6) #8-32 x 5/16 Phillips pan-head screws, and #8 flat washer as shown in [Figure 8](#).

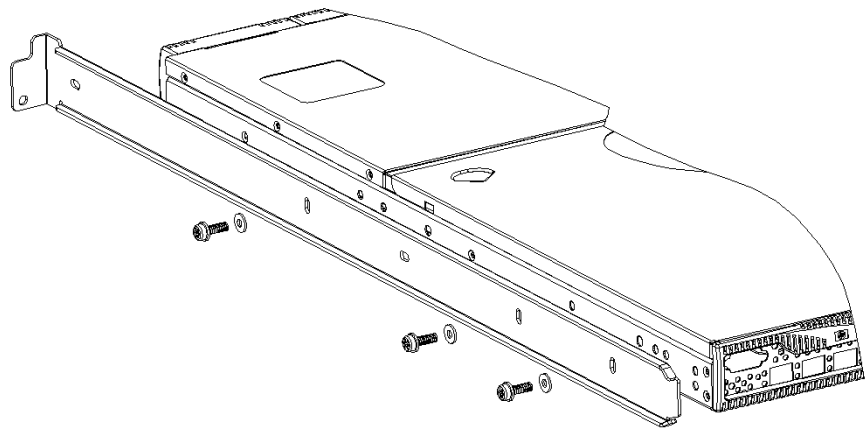


Figure 8. Assembling the Inner Rails

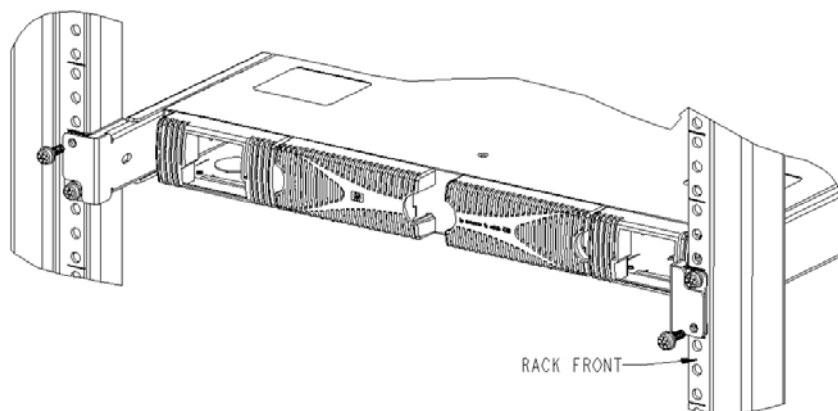


---

**CAUTION** Do not use any other screws other than the six that are provided. Use of any longer lengths can cause damage to internal components of the switch. Before tightening screws, make sure that the rails are centered to the overall height of the switch.

---

7. Insert the switch with the attached inner rails into the outer rails.
  - For an HP rack, assemble (2) remaining M5 Torx screws to complete the installation. See [Figure 9](#).



*Figure 9. Installing Switch into an HP Rack*

- For the Compaq/Rittal rack only, install the remaining #10-32 x 5/8 Phillips pan-head screws.
8. Provide power to the switch by completing the following steps:

---

**CAUTION** Ensure the power cable or cables are routed so that they are not exposed to stress when the switch is moved on the slides.

---

---

**Note** Allow for 1U space in the rack for every 10 switches to facilitate power cable management.

---

- a. Connect the power cable to the FC 16B power supply and to a power outlet.

- b. Turn on the power supply (flip the AC switch to “I”) when ready to supply power to the switch. The switch automatically runs POST (power on self-test) each time it is turned on.
- c. If the FC 16B includes a second power supply, repeat Steps [8a](#) and [8b](#) for the remaining power supply.

---

**Note** Do not connect the switch to the network until the IP address is correctly set. For instructions on how to set the IP address, see [“Configuring and Connecting the Switch”](#) on [page 17](#).

---

## System Components

The HP Surestore FC 1Gb/2Gb Switch 16B consists of the following components:

- A 1U chassis, designed to be mounted in a 19-inch rack, with forced-air cooling that flows from the power supply side of the switch to the SFP media side.
- 16 optical ports, compatible with SFPs (small form factor pluggable media).
- One RS-232 serial port (DB9 connector) on the SFP media side.
- One IEEE compliant RJ-45 connector on the SFP media side for use with 10/100 Mbps Ethernet or in-band.
- A total of 36 LEDs:
  - Two LEDs for each of the 16 ports to indicate port status and link speed information.
  - One LED on each power supply to indicate the status of that power supply.
  - One LED on the left of the SFP media side to indicate whether the switch has power.

- One LED in the center of the power supply side to indicate the overall switch status.
- Two universal input and redundant power supplies with AC switches and built-in fans. The power supplies plug into internal blind-mate connectors when installed in the chassis.
- Two fan trays, each containing two fans. Air is pulled in through the rear intake and pushed out through the vents on the SFP media side. The fans provide adequate cooling for the maximum switch power rating of 102 Watts.
- Three digital thermometers, capable of sensing a temperature range from -55 °C to +125°C, in 0.5°C increments.
- A motherboard that is completely enclosed in an EMI (electromagnetic interference) enclosure tray. The logic and chassis ground are connected to the chassis by screws. The embedded processor can process frames up to 1024 bytes.
- A real-time clock (RTC) with a 10-year, non customer-replaceable battery and 56 bytes of NVRAM.

## SFP Media Side

Figure 10 shows the SFP media side of the FC 16B, which contains the serial port, Ethernet port, fiber optic ports and their corresponding LEDs, and the switch power LED.

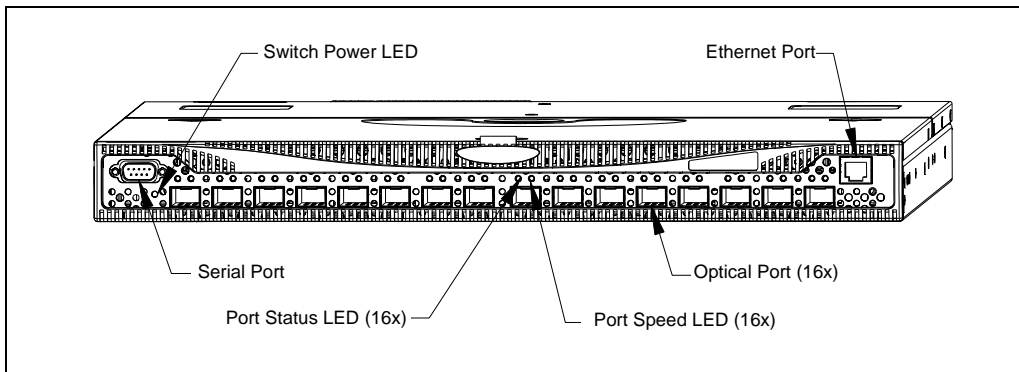


Figure 10. The SFP Media Side of the FC 16B

The ports on the SFP media side of the FC 16B are color-coded in groups with four purple ports alternating with four unmarked ports to indicate which ports can be used in the same ISL Trunking group.

---

**Note** ISL Trunking (an optionally licensed feature) is a Fabric OS feature that enables distribution of traffic over the combined bandwidth of up to four ISLs between two directly adjacent switches, while preserving in-order delivery. For information about ISL Trunking, refer to the *ISL Trunking User's Guide*.

---

## Power Supply Side

Figure 11 shows the power supply side of the FC 16B, which provides access to the fan trays and power supplies and the Switch Status LED. Each power supply also has an LED that indicates the status of that power supply. The power supplies, fan trays, and entire switch are all FRUs (field replaceable units).

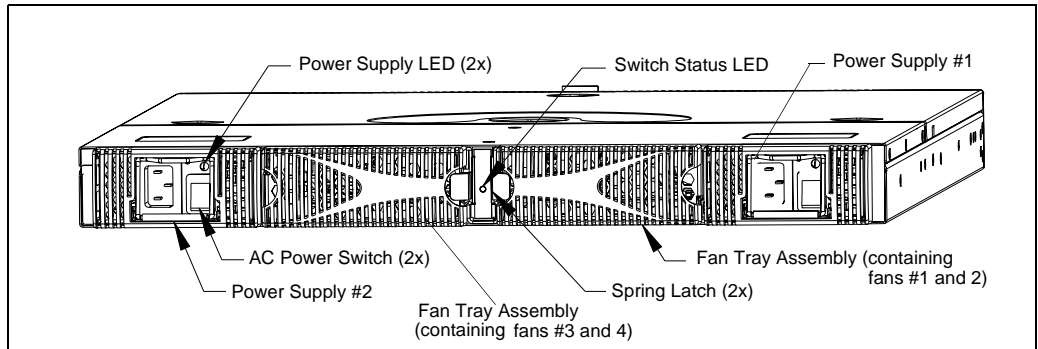


Figure 11. The Power Supply Side of the FC 16B

## Power Supply

The power supplies are universal and capable of functioning worldwide without using voltage jumpers or switches. They meet IEC 61000-4-5 surge voltage requirements and are autoranging in terms of accommodating input voltages and line frequencies. Each power supply has its own built-in fan for cooling, pushing the air towards the SFP media side of the switch. See “Power Supply” on page 37 for a list of power supply specifications.

To turn the FC 16B on, connect one or both power supplies to a power source, then flip the AC power switch to the “I” position. To turn the switch off, turn off both power supplies (if both are installed) by flipping each AC power switch to the “O” position.

---

**Note** Removing all power from the switch triggers a system reset. When power is restored, all devices are returned to the last saved state and the switch runs POST.

---

## Fabric Operating System

Included with the switch is the Fabric OS. The system provides a large number of commands and libraries to manage real-time tasks. See the *Fabric OS Reference Manual* and the *Fabric OS Procedures Guide* for details.

## SFPs

The FC 16B accommodates up to 16 SFPs (small form factor pluggable media). The SFPs supported are the SWL (short wavelength) and LWL (long wavelength) fibre-optics. Shortwave SFPs have black dots visible from the front. Longwave SFPs have blue dots visible from the front. The SFPs qualified by HP are 1Gb/2Gb capable.

To install an SFP, position the SFP so that the key (the tab near the cable-end of the SFP) is on top and insert the SFP into the port until it is firmly seated and the latching mechanism clicks. For more specific instructions, refer to the SFP manufacturer’s documentation.

---

**Note** The SFP is keyed so that it can only be inserted with the correct orientation into the port. If the SFP does not slide in easily, ensure it is correctly oriented.

---

## Fibre Channel Cable Connections

LC cables are used to plug into SFPs. The cables required for the HP/Brocade 2400 and 2800 switches have SC connectors and connect into

GBIC optic modules. LC to SC cables or adapters are required to connect the cables together.

To connect an SC cable to the FC 16B, use the HP C7540A - 2M LC male - SC male cable adapter.

Connect inter switch links (ISLs) between two FC 16B switches using an LC to LC cable.

*Table 1. Cables Used with the FC 16B*

#### LC - SC Cable Connectors

<b>Product Number</b>	<b>Part Number</b>	<b>Description</b>
C7534A	5183-2684	SC female - SC female adapter
C7540A	N/A	2M LC male - SC male adapter kit - contains both C7534A (adapter) and C7529A (2 meter cable)
C7529A	5065-5106	2m FC Cable LC-SC duplex M/M
C7530A	5065-5107	16m FC Cable LC-SC duplex M/M

#### LC - LC Cables

<b>Product Number</b>	<b>Part Number</b>	<b>Description</b>
C7524A	5065-5101	2m FC Cable LC duplex M/M
C7525A	5065-5102	16m FC Cable LC duplex M/M
C7526A	5065-5103	50m FC Cable LC duplex M/M
C7527A	5065-5104	200m FC Cable LC duplex M/M

## Configuring and Connecting the Switch

The following items are required to configure and connect the FC 16B for use in a network and fabric:

- The FC 16B installed and connected to a power source

- Workstation that has a terminal emulator application (such as HyperTerminal)
- Serial cable provided with the switch, for connecting the switch to the workstation
- An unused IP address
- Ethernet cable for connecting the switch to the workstation or to a network containing the workstation
- SFPs and FC cables, as required to connect the switch to the fabric

**To configure the FC 16B and connect it to a fabric:**

1. Replace the factory IP address and related information with the IP information provided by your network administrator by completing the following steps:
  - a. Remove the shipping plug from the serial port and insert the serial cable provided with the FC 16B.
  - b. Connect the other end of the serial cable to an RS-232 serial port on the workstation. If no RS-232 serial port is available on the workstation, the adapter on the end of the serial cable can be removed to use the RJ-45 connector to create a serial connection.
  - c. Verify that the switch power is on and POST is completed.
  - d. Disable any serial communication programs running on the workstation.
  - e. Open a terminal emulator application (such as HyperTerminal on a PC, or TERM in a UNIX environment), and configure as follows:
    - In a Windows 95, 98, 2000, or NT environment:

Parameter	Value
Bits per second:	9600
Databits:	8
Parity:	None
Stop bits:	1
Flow control:	None



- In a UNIX environment, enter the following string at the prompt:  
`tip /dev/ttyb -9600`
- f. From the terminal emulator application, log on to the switch with administrative privileges through the serial connection. The default administrative logon is `admin` and the default password is `password`.

---

**CAUTION** Do not change the default password unless local administration policy requires it.

---

- g. Enter the following at the prompt: `ipAddrSet`
- h. Enter the following information at the corresponding prompts, listed below:
  - Ethernet IP Address [10.77.77.77]: Enter the new Ethernet IP address.
  - Ethernet Subnetmask [0.0.0.0]: Enter the new Ethernet subnetmask.
  - Fibre Channel IP Address [none]: Enter the new Fibre Channel IP address if desired.
  - Fibre Channel Subnetmask [none]: Enter the new Fibre Channel subnet mask if desired.
  - Gateway Address [172.17.1.1]: Enter the new gateway address.
  - Set IP address now? [y = set now, n = next reboot]: Enter “y” to set now.
- i. You can verify the address was correctly set by entering the following:  
`ipAddrShow`
- j. Record the IP address on the label provided for this purpose on the FC 16B.
- k. Once the IP address is verified as correct, remove the serial cable and replace the shipping plug in the serial port.

---

**Note** The serial port is intended only for use during the initial setting of the IP address and for service purposes. Using the serial port during normal switch operation or for regular maintenance is not recommended.

---

2. Record the IP address for future reference.
3. Connect the switch to the workstation computer by Ethernet cable (can be a direct connection or through a network) by completing the following steps:
  - a. Remove the shipping plug from the Ethernet port.
  - b. Insert one end of an Ethernet cable in the Ethernet port.
  - c. Connect the other end of the Ethernet cable to the workstation (use a cross-over Ethernet cable and the default IP address [10.77.77.77] when connecting directly to the workstation) or to an Ethernet network containing the workstation (use a straight-through Ethernet cable and the assigned IP address from step 1 above).

---

**Note** The switch can now be accessed remotely and from multiple connections using telnet or Web Tools. Ensure that the switch is not being modified from any other connections during the remaining steps.

---

4. Log on to the switch with administrative privileges by telnet. The default administrative logon is `admin` and the default password is `password`.

---

**CAUTION** Do not change the default password unless local administration policy requires it.

---

5. Modify the domain IDs if desired by completing the following steps:

---

**Note** The default domain ID is 1. If the default domain ID is already in use when the switch is connected to the fabric, the domain ID for the new switch is automatically reset to a unique value. The domain IDs that are currently in use can be determined using the telnet command `fabricShow`.

---

- a. Disable the switch by entering the following: `switchDisable`
  - b. Enter the following: `configure`
  - c. Enter the following at the Fabric parameters prompt: `y`
  - d. Enter a unique domain ID: `Domain: (1..239) [1] 3`
  - e. Complete the remaining prompts (or press CTRL+D to accept the remaining settings without completing all the prompts).
  - f. Re-enable the switch by entering the following: `switchEnable`
6. Optional: Specify any custom status policies for the fabric by completing the following steps:
- a. Enter the following at the prompt: `switchStatusPolicySet`
  - b. Specify the desired status policies. To completely deactivate the alarm for a particular condition, enter “0” at the prompt for that condition.

---

**CAUTION** Configure each port to match the topology of each host or target before connecting to the device. The default port configuration is fabric, not private loop. The switch does not auto-sense topology.

---

7. Add the SFPs (small form factor pluggable media) and cables to the ports as required by completing the following steps:

---

**Note** The ports and FC cables used in trunking groups must meet specific requirements. For a list of these requirements, refer to the *ISL Trunking User's Guide*.

---

- a. Remove the shipping plug from the ports to be used.
- b. Position the SFP so that the key (the tab near the cable-end of the SFP) is on top, and insert the SFP into the port until it is firmly seated and the latching mechanism clicks. For more specific instructions, refer to the SFP manufacturer's documentation.

---

**Note** The SFP is keyed so that it can only be inserted with the correct orientation into the port. If the SFP does not slide in easily, ensure it is correctly oriented.

---

- c. Connect the cables to the SFPs as appropriate to the fabric topology. Position each cable so that the key (the ridge on one side of the cable connector) is aligned with the slot in the SFP. Then, insert the cable into the SFP until it is firmly seated and the latching mechanism clicks.

---

**Note** The cable is keyed so that it can only be inserted correctly into the SFP. If the cable does not slide in easily, ensure it is correctly oriented.

---

8. Optional: Verify the correct operation of the FC 16B by entering the following command from a workstation: `switchShow`. This command provides information about the status of the switch and the ports. For more information about this and other commands, refer to the *Fabric OS Procedures Guide*.

Use the `cfgSave` and `cfgEnable` commands to save any zone configurations before the switch is powered off.. The saved configuration is automatically reloaded by the switch on power up. If a configuration was enabled at the time it was saved, the same configuration is reinstalled with an automatic `cfgEnable` command.

## Saving the System Configuration Files

Upload the switch configuration file for disaster recovery and keep it in a safe place where it can be easily found. Backing up the configuration after the initial configuration changes and periodically thereafter is **strongly recommended**.

## Backing up the Switch Configuration Settings

FTP must be used on Windows workstations to backup the system configuration. The FTP server must be running before an upload can occur. Use the RSHD service or FTP on a UNIX machine.

---

**Note** The two supplied utilities, RSHD.EXE and CAT.EXE currently do not support uploads for Windows, only downloads. These utilities are available from the support web site: <http://www.hp.com/support/fc16B>.

---

1. Verify that the RSHD service (on a UNIX machine) or the FTP service (on a Windows machine) is running on the host workstation.
2. Login to the switch as the admin user.
3. At the command line enter the following command:

```
configUpload "hostIPAddr", "user",  
"path_filename", "password"
```

where `hostIPAddr` is the IP address of the host computer, `user` is the User ID used to log into this computer, `path_filename` is the path location and filename of the configuration file, and `password` is the password for the user ID specified. If only `configUpload` is entered the system prompts you for each parameter.

Example:

```
switch:admin> configupload  
Server Name or IP Address [host]: 123.45.678.901  
User Name [user]: kelev  
File Name [config.txt]: switch1  
Protocol (RSHD or FTP) [rshd]: ftp  
Password:  
upload complete
```

## Restoring the System Configuration Settings

To restore the system configuration settings from a backup:

1. Verify that the RSHD service or the FTP service is running on the host workstation (Windows or UNIX).
2. Login to the switch as the admin user.
3. Shut down the switch by entering the following command:

```
switchDisable
```

4. At the command line enter the following command:

```
configDownload "hostIPAddr", "user",  
"path_filename", "password"
```

where `hostIPAddr` is the IP address of the host computer containing the configuration file, `user` is the User ID used to log into this computer, `path_filename` is the path location and filename of the

system configuration file, and `password` is the password for the user ID specified.

---

**Note** The password operand is only required if you are using FTP.

---

5. Reboot the switch by entering the following command:

```
fastBoot
```

## Next Steps

Specific tasks remain to be completed before the switch is fully operational and manageable in your network with your equipment. These tasks and the associated tools are described in the remaining documents shipped with the product on the documentation CD-ROM. This section provides specific guidance for completing tasks that many users may need to do.

## Setting QuickLoop Mode on Ports

The default configuration for a port is fabric mode. QuickLoop is used to connect private hosts to private storage using the Fibre Channel network. A QuickLoop zone, connecting two switches, may be used to expand the number of private hosts and storage connected. An entire switch can be set to operate in QuickLoop mode using the `qlEnable` telnet command. A port on a switch operating in Mixed mode can be set to or removed from QuickLoop using the telnet commands `qlPortEnable` and `qlPortDisable`. See the *QuickLoop User's Guide* for more details.

## Setting Up Speed Negotiation

The FC 16B ports can operate at three different speed levels: auto-sensing mode, 1 Gbps mode, or 2 Gbps mode. Use the telnet command `switchCfgSpeed` to set the speed level for all ports in a switch. Use the `portCfgSpeed` to set the speed level for a single port. Depending on your environment you may need to force a port to use a specific speed level. Auto negotiation may not be supported by the device. Check the configuration information for your network components for specific requirements. See the *Fabric OS Reference Manual* for a detailed command description.

## Configuring Supported Devices

### HP Surestore Director FC-64 Switch

The FC 16B switch can be used with the HP Surestore Director FC-64 switch. Specific configurations must be set on both devices to make this work.

On the FC 16B, logon to the switch with administrative privileges and enter the following telnet commands:

1. `switchDisable`
2. `interopMode 1`
3. `switchEnable`

On the Director FC-64 switch, the following steps must be completed to configure the switch for interoperability:

- Step 1: Verify Unique Domain IDs
- Step 2: Select a Single Surestore FC-64 Director as Principal Switch
- Step 3: Verify Unique Zone Names
- Step 4: Verify Brocade Product Zoning Configurations
- Step 5: Verify Zone Naming Conventions
- Step 6: Verify Operating Mode
- Step 7: Verify Surestore FC-64 Director Switches' Operating Parameters
- Step 8: Verify Firmware Version
- Step 9: Verify EFC Manager Version
- Step 10: Verify Private Loop Targets on Brocade Products are Translated to Fabric
- Step 11: Add Switches to Fabric
- Step 12: Complete Zoning Activities
- Step 13: Save Active Zone Set

For complete instructions on configuring the HP Director FC-64 switch see "Checklist for Merging Fabrics" in the *Merging Heterogeneous Fabrics Instructions* white paper on the FC 16B documentation CD-ROM.

## HP Surestore VA 7400

The FC 16B also can support a 2Gb connection to an HP Surestore Virtual Array 7400. Set the port speed to 2Gb using the telnet command `portCfgSpeed`.

Use the Virtual Front Panel (VFP) on the VA 7400 and configure the device as follows:

1. Change the controller port data rate to 2 Gbits/s
  - a. To change the port data rate to 2 gigabits/second for controller 1, enter:  

```
vfpmgr -S 2 -c 1
```

When prompted to reset, enter `no`.
  - b. To change the port data rate for controller 2, enter:  

```
vfpmgr -S 2 -c 2
```

When prompted to reset, enter `no` if additional settings must be changed. If all changes have been made, enter `yes` to reset the array.
2. Change the controller port topology.
  - a. To change the port topology for controller 1 enter the following command, selecting 4 for Direct Fabric Attach:  

```
vfpmgr -t 4 -c 1
```

When prompted to reset, enter `no`.
  - b. To change the port topology for controller 2 enter the following command, using the same topology value used for controller 1:  

```
vfpmgr -t 4 -c 2
```

When prompted to reset, enter `no` if additional settings must be changed. If all changes have been made, enter `yes` to reset the array.

## Private Loop Devices

To work with private loop devices such as the FC 60, the FC 10, or the SCSI bridge FC 4/2, set the FC 16B switch port as an L\_PORT. See the telnet command `portCfgLport`.



---

# DIAGNOSTICS

## Switch Status Indicators

System activity and status can be determined through the activity of the LEDs on the switch.

---

**Note** The LEDs may flash yellow during diagnostic tests; green, yellow, or orange during POST. This is normal and does not indicate a problem unless the LEDs do not return to a normal pattern after POST or the other diagnostic tests are complete.

---

The HP Surestore FC 1Gb/2Gb Switch 16B includes the following LEDs:

- 16 port status LEDs on the SFP media side (above and to the left of each port) to indicate the status of each port.
- 16 port speed LEDs on the SFP media side (above and to the right of each port) to indicate the current link speed of each port.
- One switch power LED below the serial port on the SFP media side, to indicate whether the switch is on and has successfully booted.
- Two power supply LEDs on the power supply side (one on each power supply) to indicate the status of each power supply.

- One switch status LED in the center of the power supply side to indicate whether the switch is on and has successfully booted, and whether any of the ports are faulty.

## LEDs on the SFP Media Side

Figure 12 shows the SFP media side of the FC 16B with the LEDs identified.

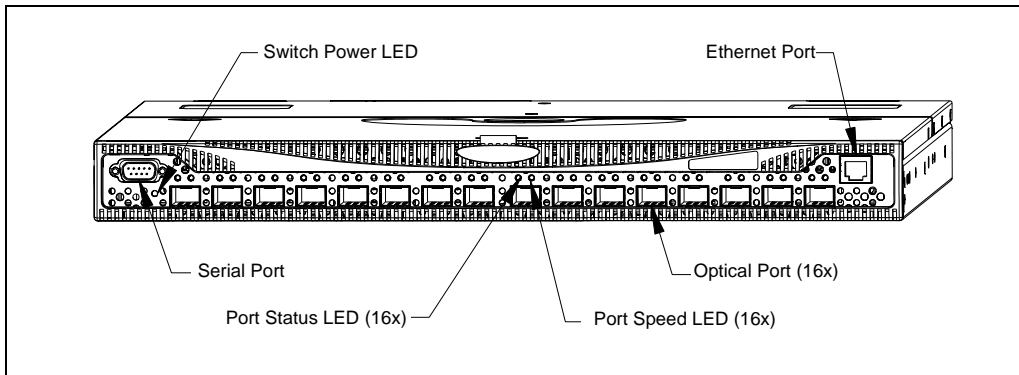


Figure 12. The SFP Media Side of the FC 16B

The following table describes the LEDs above each port on the left. These LEDs indicate the status of the port.

Color of LED	Status of Hardware	Recommended Action
No light	No light or signal carrier (media or cable) is detected.	Check media and cable.
Steady green	Port is online (connected to an external device) but has no traffic.	No action required.
Slow-flashing green (on 1 second; off 1 second)	The port is online but segmented, indicating a loopback cable or incompatible switch.	Verify correct device is connected to port.

<b>Color of LED</b>	<b>Status of Hardware</b>	<b>Recommended Action</b>
Fast-flashing green (on 1/4 second; off 1/4 second)	The port is in internal loopback (diagnostic).	No action required.
Flickering green	Port is online, with traffic flowing through port.	No action required.
Flashing or steady yellow	POST is running.	No action required.
Steady orange	Port is receiving light or signal carrier, but is not yet online.	No action required.
Slow-flashing orange (on 1 second; off 1 second)	The port is disabled (result of diagnostics or portDisable command).	Reset the port from a management station.
Fast-flashing orange (on 1/4 second; off 1/4 second)	The port is faulty.	Reset the switch from a management station.
Alternating green and yellow	Port is bypassed.	Reset the port from a management station.

The following table describes the LEDs above each port on the right. These LEDs indicate the speed of the port.

<b>Color of LED</b>	<b>Status of Hardware</b>	<b>Recommended Action</b>
No light	The port is transmitting/receiving at 1 Gbps.	No action required.
Steady green	The port is transmitting/receiving at 2 Gbps.	No action required.

The following table describes the LEDs below the serial port. These LEDs indicate the switch power.

Color of LED	Status of Hardware	Recommended Action
No light	Either the switch is off, or boot is not complete, or boot has failed.	Verify that the switch is on and boot has had time to complete. If there is still no light, contact HP support.
Steady green	Switch is on and boot has successfully completed.	No action required.
Slow-flashing green	Diagnostic failure on one or more ports.	Errors may be listed in the error log. Refer to the <i>Fabric OS Procedures Guide</i> for more information.

## LEDs on the Power Supply Side

Figure 13 shows the power supply side of the switch with the LEDs identified.

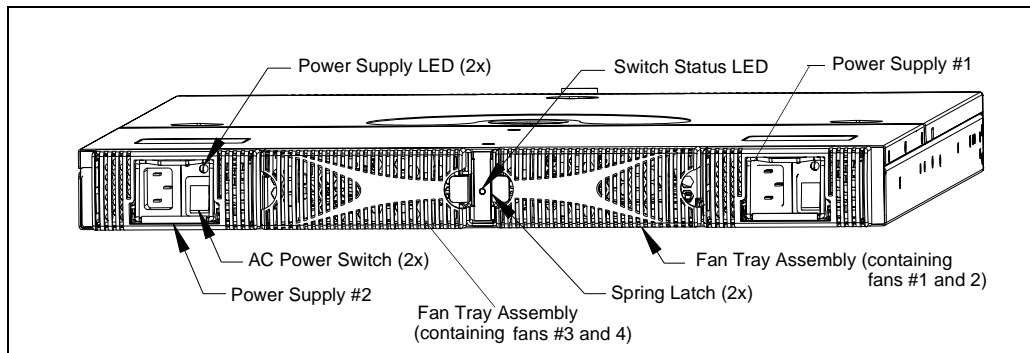


Figure 13. The Power Supply Side of the FC 16B

The following table describes the LEDs on each power supply. These LEDs indicate the status of the related power supply.

Color of LED	Status of Hardware	Recommended Action
No light	Power supply is not providing power.	Verify power supply is on and power cable is connected to a valid power source.
Steady green	Power supply is providing power.	No action required.

The following table describes the LED in the center of the power supply side. This LED indicates the status of the switch.

Color of LED	Status of Hardware	Recommended Action
No light	Either the switch is off, or boot is not complete, or boot has failed.	Verify that the switch is on and boot has had time to complete. If there is still no light, contact HP support.
Steady green	Switch is on and boot has successfully completed.	No action required.
Steady yellow	Diagnostic command is in progress, or one or more ports are faulty.	If no diagnostic tests are running, check the Port Status LEDs for fault indicators.
Slow-flashing yellow	Diagnostic failure on one or more ports.	Errors may be listed in the error log. Refer to the <i>Fabric OS Procedures Guide</i> for more information.

## Maintenance and Diagnostic Tests

The FC 16B does not require any regular physical maintenance, and is designed to minimize the chance of failure, including diagnostic tests and field-replaceable units.

Diagnostic tests are provided to help troubleshoot the hardware and the firmware. The diagnostic tests provided on the switch include tests of internal connections and circuitry, fixed media, and any SFP modules and fiber optic cables in use. The tests are implemented by command, either through a telnet session or through a terminal set up for a serial connection to the switch. Some tests require the ports to be connected by external cables, to allow diagnostics to verify the serializer/deserializer interface, as well as the attached SFP and cable.

All diagnostic tests are run at link speeds of both 1 Gbps and 2 Gbps. For detailed information about the specific diagnostic tests and how to run them, refer to the *Fabric OS Procedures Guide*.

Test	Command	Description
Error Log	errDump	Displays the error log without page breaks.
Switch Offline	switchDisable	Sets the switch to offline state necessary to run certain switch diagnostics.
Memory Test	ramTest	Checks CPU RAM memory. Run offline or online.
Port Register Test	portRegTest	Checks that the registers and static memory in each ASIC can be successfully accessed. Run offline.
Central Memory Test	centralMemoryTest	Checks that the central memory in each ASIC can be successfully accessed. Run offline.
Control Message Interface (CMI) Conn Test	cmiTest	Verifies that control messages can be sent from ASIC to ASIC. Run offline.

Test	Command	Description
Content Addressable Memory (CAM) Test	camTest	Verifies CAM functionality. Run offline.
Port Loopback Test	portLoopbackTest	Checks all switch main board hardware. Frames transmitted are looped back and received. Run offline.
Cross Port Test	crossPortTest	Checks all switch paths. Frames transmitted by port M are looped back via external cable and received at port N. Run offline or online.
Spin Silk Test	spinSilk	Checks all switch paths at the maximum speed of 1 Gbps. Frames transmitted by port M are looped back via external cables and when received by port N are sent again by port M in an external loop. Run offline.
SRAM Data Retention Test	sramRetentionTest	Verifies that data written into ASIC memories is retained. Runs offline.
CMem Data Retention Test	CmemRetentionTest	Verifies that data written into ASIC SRAMs is retained. Runs offline.
Switch Online	switchEnable	Returns switch to online state.

**Note** The transmit and receive speed of the links may be temporarily locked to a specific speed during diagnostic testing.

## Error Messages

To analyze error messages, access the error message log via a Telnet session using the `errDump` command. Note any messages before removing power from the switch; error messages are stored in RAM and are lost when power is removed. See the *Fabric OS Reference Manual* for a detailed description of each message.

## Getting Support

### Service and Support

There are no customer serviceable parts in the FC 16B. For the most current technical support information for the FC 16B, visit the HP Web site at [www.hp.com/support/fc16B](http://www.hp.com/support/fc16B).

### Additional Licenses

For information on obtaining license keys visit the HP Web site at [www.hp.com/support/fc16B](http://www.hp.com/support/fc16B).



---

# SPECIFICATIONS

## General

The following table lists the general specifications for the HP Surestore FC 1Gb/2Gb Switch 16B.

<b>Specification</b>	<b>Description</b>
Fabric initialization	Complies with FC-SW 5.0
IP over Fibre Channel (FC-IP)	Complies with FC-IP 2.3 of the FCA profile
System architecture	Non-blocking shared-memory switch
System processor	Intel 80960VH, 100MHz CPU
Number of Fibre Channel ports	16 SFP ports
Fibre Channel port speed	1 or 2 Gbps full duplex

---

Specification	Description
Modes of operation	Fibre Channel Class 2 and Class 3
Aggregate switch I/O bandwidth	64 Gbps if all 16 ports running at 2 Gbps, full duplex
Frame buffers	27 buffers per E_Port and 16 buffers per F_Port at 2112 bytes per frame
Port to port latency	Less than 2 microseconds with no contention (destination port is free)
Data transmission range	Up to 500 m (1,625 ft.) for short-wavelength optical link Up to 10 km (32,820 ft.) for long-wavelength optical link
Chassis type	Forced-air cooling that flows from the power supply side to the SFP media side

## Environmental

The following table lists the acceptable environmental ranges.

Condition	Acceptable Range
Temperature (operating)	10°C to 40°C
Temperature (non-operating)	-35°C to 65°C
Humidity (operating)	5% to 85% RH non-condensing, at 40°C
Humidity (non-operating)	0% to 90% RH non-conducting, at 40°C
Altitude (operating)	0 to 3 kilometers above sea level
Altitude (non-operating)	0 to 12 kilometers above sea level
Shock (operating)	4 G, 11 MS duration, half sine
Shock (non-operating)	20 G, 11 MS duration, sq. wave
Vibration (operating)	5 G, 0-3 kHz at 1.0 octave/minute

Condition	Acceptable Range
Vibration (non-operating)	10 G, 0-5 kHz at 1.0 octave/minute

## Dimensions

The following table lists the dimensions of the FC 16B.

Dimension	Value
Height	1U
Depth	24 inches (61.0 cm)
Width	17 inches (43.2 cm)
Weight (with both power supplies installed)	28.5 lbs (12.9 kg)

## Power Supply

The following table lists the power supply specifications.

Specification	Value
Total power available from each power supply	126 Watts, with fans operating
Input voltage	100 - 240 VAC
Input line frequency	47 - 63 Hz
Harmonic distortion	Active power factor correction per IEC1000-3-2
BTU rating	108 Watts x 3.412 BTU/Hr/Watts = 368.5 BTU/Hr



---

## PRODUCT REGULATORY INFORMATION

### FCC EMC Statement (USA)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense. The end user of this product should be aware that any changes or modifications made to this equipment without the approval of Hewlett-Packard could result in the product not meeting the Class A limits, in which case the FCC could void the user's authority to operate the equipment.

### EMC Statement (Canada)

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

### EMC Statement (European Union)

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

### Spécification ATI Classe A (France)

DECLARATION D'INSTALLATION ET DE MISE EN EXPLOITATION d'un matériel de traitement de l'information (ATI), classé A en fonction des niveaux de perturbations radioélectriques émis, définis dans la norme européenne EN 55022 concernant la Compatibilité Electromagnétique.

## Germany Noise Declaration

Schalldruckpegel  $L_p = 46.1$  dB(A)  
Am Arbeitsplatz (operator position)  
Normaler Betrieb (normal operation)  
Nach ISO 7779:1999 (Typprüfung)

## VCCI EMC Statement (Japan)

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

## Harmonics Conformance (Japan)

高調波ガイドライン適合品

## BSMI EMC Statement (Taiwan)

警告使用者：這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

## RRL EMC Statement (Korea)

사용자 안내문 : A 급기기

이 기기는 업무용으로 전자파 적합등록을 받은 기기 이오니, 판매자 또는 사용자는 이점을 주의하시기 바라며, 만약 잘못 구입하셨을 때에는 구입한 곳에서 비업무용으로 교환하시기 바랍니다.

# Laser Safety

## A. Certification and Classification Information

When equipped with native Fibre Channel adapters, this product contains a laser internal to the small form factor pluggable (SFP) transceiver modules.

In the USA, the SFP module is certified as a Class 1 Laser product, conforming to the requirements contained in Department Of Health and Human Services (DHHS) regulation 21 CFR, Subchapter J. The certification is indicated by a label on the metal SFP housing.

Outside the USA, the SFP is certified as a Class 1 Laser product conforming to requirements contained in IEC 825-1:1993 and EN60825-1:1994, including Amendment 11:1996.

The SFP includes the following certifications:

- UL Recognized Component (USA)
- CSA Certified Component (Canada)
- TUV Certified Component (European Union)
- CB Certificate (Worldwide)

The following figure shows the Class 1 information label that appears on the metal housing of the SFP.

CLASS 1 LASER PRODUCT 21 CFR(J)

## B. Product Information

Each communications port consists of a transmitter and receiver optical subassembly. The transmitter subassembly contains internally a semiconductor laser diode in the wavelength of either 850 nanometers (shortwave laser) or 1310 nanometers (longwave laser).

Class 1 Laser products are not considered hazardous.



---

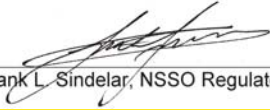
**WARNING** There are no user maintenance operations, service operations, or adjustments to be performed on the SFP module.

---

## C. Usage Restrictions

Failure to comply with these usage restrictions may result in incorrect operation of the system and points of access may emit laser radiation above the Class 1 limits established by the IEC and U.S. DHHS.

# Declaration of Conformity

<b>DECLARATION OF CONFORMITY</b> according to ISO/IEC Guide 22 and EN 45014	
<b>Manufacturer's Name:</b>	Hewlett-Packard Company Network Storage Solutions Organization
<b>Manufacturer's Address:</b>	8000 Foothills Blvd. Roseville, CA 95747 USA
<b>declares, that the product</b>	
<b>Product Name:</b>	hp surestore fc 1Gb/2Gb switch 16B
<b>Model Number(s):</b>	A7340A, A7340AZ
<b>Product Options:</b>	All
<b>conforms to the following Product Specifications:</b>	
Safety:	IEC 60950:1991 + A1, A2, A3, A4 / EN 60950:1992 + A1, A2, A3, A4, A11 GB 4943-1995 IEC 60825-1:1993 / EN 60825-1:1994 + A11, Class 1 (Laser/LED)
EMC:	CISPR 22:1997 / EN 55022:1998 Class A <sup>1</sup> GB 9254-1988 CISPR 24:1997 / EN 55024:1998 IEC 61000-3-2:1995 / EN 61000-3-2:1995 +A14 IEC 61000-3-3:1994 / EN 61000-3-3:1995
<b>Supplementary Information:</b>	
The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC and carries the CE marking accordingly.	
1) The Product was tested in a worst-case test configuration which maximizes RFI emissions.	
Roseville, CA October 15, 2001	 Frank L. Sindelar, NSSO Regulatory Mgr.
European Contact: Your local Hewlett-Packard Sales and Service Office or Hewlett-Packard GmbH, Department HQ-TRE, Herrenberger Straße 130, D-71034 Böblingen (FAX: + 49-7031-14-3143)	









Technical information in this document  
is subject to change without notice.

© Copyright Hewlett-Packard Company 2001.  
All right reserved.  
Reproduction, adaptation, or translation  
without prior written permission is prohibited  
except as allowed under the copyright laws.

Printed in U.S.A.  
E1201

Manual Part Number  
A7340-96002

**\*A7340-96002\***